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NATIONAL TICK SURVEY Calendar Year 1963

November 9, 1964

History

The attention of that portion of the American scientific community having responsibilities in the areas of animal disease control was directed toward ticks as vectors of animal diseases when, in 1889, scientists of the United States Department of Agriculture discovered that cattle fever ticks, *Boophilus annulatus*, were vectors of bovine piroplasmiasis. This was the first experimental proof that disease can be borne by arthropods and is regarded as one of the great achievements of medical research.

During the period of the great tick eradication program, 1907-1943, also a first in regulatory veterinary medicine, our attention in this country was directed largely toward the *Boophilus* ticks. These ticks will receive considerable attention and active programs continue to prevent their reintroduction and to eliminate those which do find their way into this country. The tropical variety of the cattle fever tick, *B. microplus*, encountered in Florida and Puerto Rico, seemed to have a broader host preference and was commonly found on sheep, goats, and deer, as well as cattle and horses.

Although most organized efforts against ticks in the United States have been directed against *Boophilus* spp., limited surveys, usually confined to small areas, were made to learn something of the prevalence and location of other ticks established in this country. Further research disclosed that, in addition to causing losses resulting from wounds produced during feeding, injection of toxic substances, and extraction of large amounts of blood, many of our domestic ticks can and do serve as vectors of several infectious diseases of man and/or animals.

One of the most likely pathways for exotic ticks to enter this country is through the entry of exotic zoo and exhibition animals. Many of which are shipped directly from areas of the world which are heavily infested with ticks of both potential and real danger to our livestock industries. In years past, collections of exotic ticks have been made at various inland zoos. Although certain of these are a matter of public record at one place or another, the information is not generally available at any one place and is probably rather incomplete. Inasmuch as there was not always a continuous effort to survey tick populations at all locations, tick infestations of zoo animals may well have gone unnoticed, and, due to the general environmental conditions at city zoos, did not persist. However, the keeping of exhibition animals is undergoing considerable change and the present trend seems to be to exhibit such animals in "more natural" environments. These natural environments are out of the comparative safety of the city and are in areas where more direct contact with our domestic livestock is possible. Exotic animal "farms or ranches" have been established at several locations and others are in the planning stages. This considerably increases the danger potential to our domestic livestock and makes tick surveys even more important.

The present National Livestock Tick Survey actually had its beginning in Florida in conjunction with their last *B. microplus* outbreak which occurred in 1960. Intensive inspections and surveys were made on farms and at auction markets and slaughtering plants to locate all foci of the infestation. Livestock regulatory officials were not content with determining that a tick specimen merely was or wasn't *Boophilus*, but instead established the policy of sending all specimens to a central location where identification was made by an experienced taxonomist. This thinking quickly paid off handsomely as an extremely important exotic tick, *Rhipicephalus cuneatus*, was found on imported exhibition animals at an animal farm. Further efforts resulted in locating exotic ticks at a second animal farm in Florida and one in New York State. Strenuous efforts to eradicate these ticks have been successful and represent the only instances in which these ticks have been eradicated from an infested country. Had the infestation become more widespread in this country prior to detection, eradication would have been much more difficult, if not impossible.

Potential Dangers of Exotic Ticks

The threat of introducing exotic parasites and diseases is probably greater today than at any time in our history. This is true for several reasons. For one thing, modern, rapid transportation, with all the advantages it has brought us, has also confronted us with some new problems that our predecessors generally did not have to face. For instance, it is now possible to load animals on swift ocean-going vessels in Africa, Asia, or Europe; and within only a few days they are at one of our ports of entry. With air transportation--and more and more animals are being shipped by air each year--the time interval from departure to arrival is measured in hours, not days.

In earlier days, the long, slow voyages of the windjammers were probably the primary reason that many more exotic parasites and diseases were not introduced into the United States and other parts of the Americas. Years ago the infected animals generally died or perhaps recovered so that upon arrival they were less of a threat to our domestic livestock. Perhaps more ectoparasites were not introduced as many completed their life cycles and dropped off the host before arrival at the port of entry.

Without a doubt, the exotic ticks pose a greater potential threat to our livestock industry than any other arthropod. They are a definite threat for two reasons: The damage that they can do as blood suckers and the diseases that they are capable of transmitting. The ticks, of all the arthropods, are the most notorious vectors of livestock diseases. We, here, are very fortunate as we have few ticks capable of causing the damage that the ticks cause in Africa. Africa is teeming with many species of ticks that, if they were introduced into the United States and South and Central America, could easily decimate our livestock industry. Exotic vectors could also be introduced intentionally to cripple a livestock industry.

Eradication of many of these species would probably be impossible once they became firmly established. It is true that we have eradicated the *Boophilus* ticks from the United States and even though this was a very difficult and costly task, it would seem a minor accomplishment when compared to the problem of eradicating certain exotic species. The *Boophilus* ticks are one-host ticks and the bovine is the primary host. They spend all their parasitic life cycle, that is as the larva, nymph, and adult, on the same host. Thus, by treating the primary host enough times and at the appropriate intervals all the ticks can either be killed by the treatment or starved if they have failed to find a host.

Many of the exotic ticks, however, are three-host ticks. Although the biology varies from species to species, the larval stage is generally spent on birds or small rodents, after which it drops off and molts to the nymphal stage. The nymphal stage usually attaches to a rodent or some small wild or domestic animal, engorges, and drops to the ground to molt to the adult stage. The adult usually attacks larger wild or domestic animals. Three-host ticks are extremely difficult to eradicate since it would be next to impossible to control the immature stages on the wildlife. Also, many of the immature and mature stages can survive for long periods without a blood meal.

Purpose and Nature of the Tick Survey

The purpose of the tick survey is to systematically monitor our tick populations, not only to find exotic species which may have gained entrance, but also to develop additional information on the distribution and problem of ticks presently established here. Such information is essential when the control of any tick-borne disease is contemplated. The ticks we have not only serve as vectors of diseases presently in this country, but might well become important vectors of foreign diseases, should such diseases appear.

Most of the specimens identified during this survey were collected by State and Federal veterinarians and livestock inspectors. Ticks were collected during the course of regular work assignments such as brucellosis and tuberculosis testing, inspection of livestock at stockyards, auction markets, screwworm inspection stations, and other collection points where livestock were assembled. Veterinary practitioners have also participated in the survey.

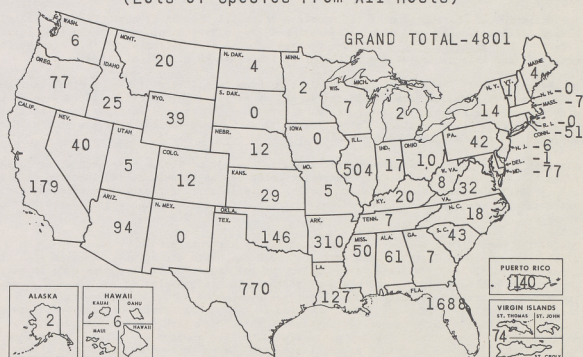
In several States the cooperation of State and Federal wildlife management personnel aided materially in the collection of ticks from numerous species of small and large game animals. Dr. Frank A. Hayes, Director of the Southeastern Cooperative Wildlife Disease Study, School of Veterinary Medicine, University of Georgia, has been active in encouraging wildlife biologists and game wardens to collect the exotic ticks from white-tail deer and other wildlife throughout the southeastern States. The Southeastern Cooperative Wildlife Disease Study is a regional cooperative multi-State wildlife research program in which thirteen southeastern States and the School of Veterinary Medicine, University of Georgia, collaborate with the United States Fish and Wildlife Service in the study of the diseases of native wildlife.

REPORT OF ALL TICKS COLLECTED
CALENDAR YEAR 1963

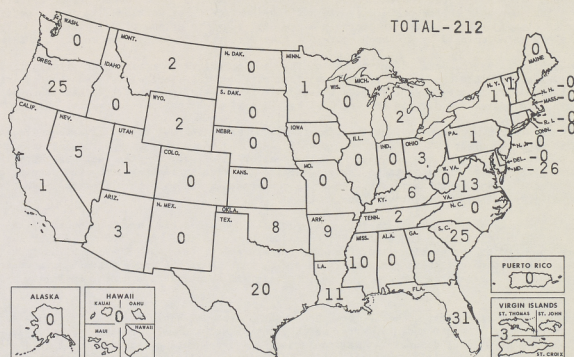
STATE	TOTAL	CATTLE	SHEEP & GOATS	DOGS	ZOO ANIMALS	WILDLIFE
TOTAL	4801	2697	1247	444	201	212
Alabama	61	19	15	27	0	0
Alaska	2	0	0	2	0	0
Arizona	94	59	17	4	11	3
Arkansas	310	206	27	32	36	9
California	179	39	109	27	3	1
Colorado	12	4	6	2	0	0
Connecticut	51	0	2	45	4	0
Delaware	1	0	0	1	0	0
Florida	1688	678	904	55	20	38
Georgia	7	2	0	2	3	0
Hawaii	6	5	0	1	0	0
Idaho	25	5	9	8	3	0
Illinois	504	475	5	9	15	0
Indiana	17	2	0	6	9	0
Iowa	0	0	0	0	0	0
Kansas	29	14	8	6	1	0
Kentucky	20	2	0	12	0	6
Louisiana	127	101	5	1	9	11
Maine	4	0	0	4	0	0
Maryland	77	17	4	20	10	26
Massachusetts	7	4	2	1	0	0
Michigan	2	0	0	0	0	2
Minnesota	2	0	0	1	0	1
Mississippi	50	26	0	12	2	10
Missouri	5	3	1	0	1	0
Montana	20	8	8	2	0	2
Nebraska	12	2	1	4	5	0
Nevada	40	21	4	8	2	5
New Hampshire	0	0	0	0	0	0
New Jersey	6	0	3	2	1	0
New Mexico	0	0	0	0	0	0
New York	14	0	0	12	1	1
North Carolina	18	11	0	5	2	0
North Dakota	4	3	0	1	0	0
Ohio	10	2	3	2	0	3
Oklahoma	146	115	11	6	6	8
Oregon	77	11	8	26	7	25
Pennsylvania	42	1	2	35	3	1
Rhode Island	0	0	0	0	0	0
South Carolina	43	11	1	1	5	25
South Dakota	0	0	0	0	0	0
Tennessee	7	2	0	0	3	2
Texas	770	631	47	45	27	20
Utah	5	2	1	1	0	1
Vermont	1	0	0	0	0	1
Virginia	32	16	1	1	1	13
Washington	6	3	0	2	1	0
West Virginia	8	2	3	2	1	0
Wisconsin	7	2	0	1	4	0
Wyoming	39	10	13	9	5	2
Puerto Rico	140	116	23	1	0	0
Virgin Islands	74	67	4	0	0	3

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Jan 1963

TICKS COLLECTED CALENDAR YEAR 1963
(Lots of Species From All Hosts)

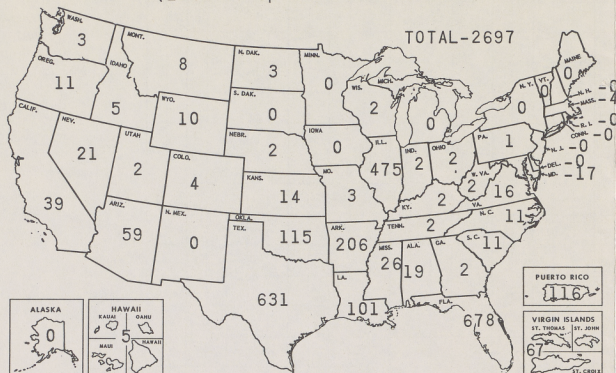


TICKS COLLECTED CALENDAR YEAR 1963
(Lots of Species From Native Wildlife)



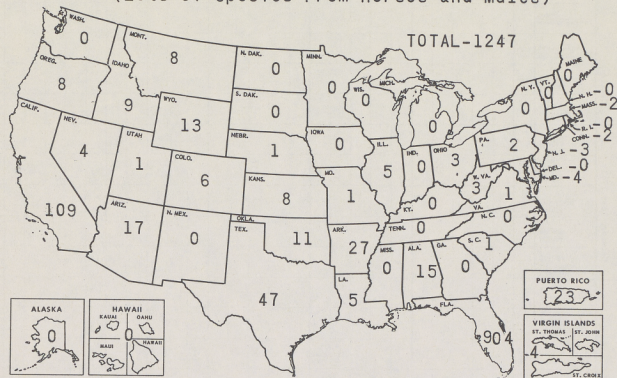
TICKS COLLECTED CALENDAR YEAR 1963

(Lots of Species From Cattle)



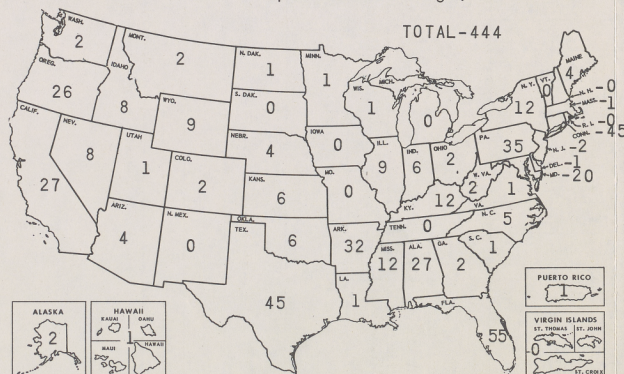
TICKS COLLECTED CALENDAR YEAR 1963

(Lots of Species From Horses and Mules)



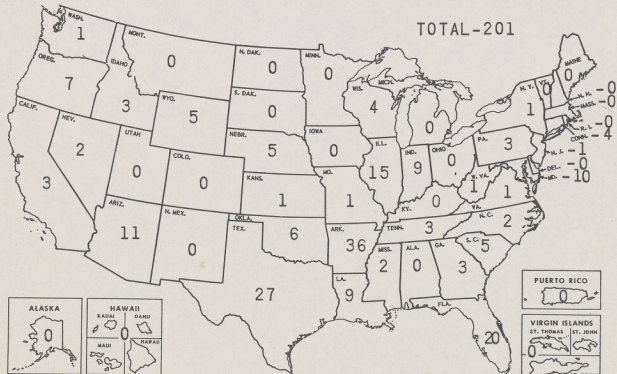
TICKS COLLECTED CALENDAR YEAR 1963

(Lots of Species From Dogs)



TICKS COLLECTED CALENDAR YEAR 1963

(Lots of Species From Zoo Animals and Miscellaneous Hosts)



REPORT OF TICKS COLLECTED

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* Evidently recently shipped in, not known to be established.

Key to species:

- a. *Dermacentor parvum*
 g. *Ixodes kingi*
 k. *Haemaphysalis chordeilis*

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REPORT OF TICKS COLLECTED																PERIOD										HOST																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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Key to species:
d. Amblyomma tuberculatum

USDA-ARS

REPORT OF TICKS COLLECTED

STATE	TOTAL	PERIOD														HOST									
		Calendar Year 1963														Dogs									
		ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED	DOG SPOTS	DOG SPOTS	DOG SPOTS	DOG SPOTS	DOG SPOTS	DOG SPOTS	DOG SPOTS	DOG SPOTS	DOG SPOTS	DOG SPOTS
TOTAL	444	29																							
Alabama	27				1									4	163	5									12
Alaska	2																								2*
Arizona	4																								4
Arkansas	32	14			1													1							
California	27												4	10				7					3		3
Colorado	2																	1							1
Connecticut	45													22						3	2				18
Delaware	1																								1
Florida	55	1			4									13						4					33
Georgia	2													1						1					
Hawaii	1																								1
Idaho	8																							8	
Illinois	9	2												7											1
Indiana	6													5											
Iowa	0																								
Kansas	6													4											1
Kentucky	12	1												11											
Louisiana	1													1											
Maine	4													1			2			1					
Maryland	20													12			1								7
Massachusetts	1													1											
Michigan	0																								
Minnesota	1													1											
Mississippi	12													12											
Missouri	0																								
Montana	2																								
Nebraska	4													4											
Nevada	8														2									5	1
New Hampshire	0																								
New Jersey	2													1											1
New Mexico	0																								
New York	12																3			1					8
North Carolina	5													4					1						
North Dakota	1													1											
Ohio	2													2											
Oklahoma	6	2												1										1	2
Oregon	26													1				19						1	1
Pennsylvania	35				1*									7			2			1					24
Rhode Island	0																								
South Carolina	1													1											
South Dakota	0																								
Tennessee	0																								
Texas	45	9			1									6						2				1	26
Utah	1														1										
Vermont	0																								
Virginia	1													1											
Washington	2																								2
West Virginia	2													1			1								
Wisconsin	1													1											
Wyoming	9													1	2		1								2
Puerto Rico	1																								1
Virgin Islands	0																								

ADE FORM 5-55
MAY 1963

* Evidently recently shipped in, not known to be established.

Key to species:

b. Ixodes angustus
c. Ixodes rufusg. Ixodes kingi
h. Ixodes sculptus

USDA-ARS

REPORT OF TICKS COLLECTED

STATE	TOTAL	PERIOD																POST 1900 Animals and Miscellaneous Hosts (human, sheep, etc.)					
		Calendar Year 1963																DOG	CATTLE	SHEEP	HUMAN	MISC.	OTHER
TOTAL	201	55	1	1	6	4	1			7	2	1	62	4	3	1	2	5	20		13	13	
Arizona	11	14Q								1Q			1C							2C	2X	1Y	
Arkansas	36	1Y											1Y					3Q		1Q			
		8H											3Q					1H					
California	3									1Q			1C								1Q		
Connecticut	4												1C			1R					1H		
Florida	20	1Q			1Q	1 ^d	1X						1Q					1C			1Q		
Georgia	3				1Q								1C					1Y	5Q		1Q	1X	
					1R																		
Idaho	3												15H				1Q						
Illinois	15	4Q											4Y								1Q		
		1H											15H										
Indiana	9												3Q										
													2H										
													2X										
													55H										
Kansas	1												1Y										
Louisiana	9	1Q			1Q								1H					1Y					
		1Q																1Q					
		2Y																					
Maryland	10	1H											1Y										
													1R										
													1C										
													2Q										
Mississippi	2	1H											1Q										
Missouri	1				1Q																		
Nebraska	5												2Q	1H							1Q		
Nevada	2												1Q			1Q ^a							
New Jersey	1												1Q										
New York	1																						
North Carolina	2												2Q									1Q	
Oklahoma	6	1H			15H	1R ^a												1H			1Q		
		2Q																3C					
Oregon	7									15H		1H		1H									
Pennsylvania	3												1X								1X		
South Carolina	5												1C								1C		
Tennessee	3	1Y											2Y					3Q					
Texas	27	1X		1Q	1Q					1H			1H					1C			25H	1X	
		9H											1Y					2H			1C		
		25H											1Y										
Virginia	1																						
Washington	1																	1H					
West Virginia	1																						
Wisconsin	4					1Q5							3H										
Wyoming	5									2Q				1H	2H								

ADE Form 5-55
March 1953

Key to Hosts:

C Domestic cat R Rabbit Y Swine
 GS Goose RH Rhinoceros
 CT Goat SH Sheep
 H Human T Turtle
 Q Host not given X Inanimate object

Key to species:

a. Dermacentor parumapertus
 d. Amblyomma tuberculatus
 e. Amblyomma hebraeum

* Evidently recently shipped in,
 not known to be established.

USDA-ARS

REPORT OF TICKS COLLECTED

STATE	TOTAL	PERIOD														HOST				
		Calendar Year 1963														Native Wildlife				
		ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED	ALL TICKS COLLECTED
TOTAL	212	28		13																
Alabama	0																			
Alaska	0																			
Arizona	3																	3 K		
Arkansas	9	4 D													5 D					
California	1												1 R							
Colorado	0																			
Connecticut	0																			
Delaware	0																			
Florida	31	3 D		9 D				1 D			1 WC			3 R		13 D			1 R	
Georgia	0																			
Hawaii	0																			
Idaho	0																			
Illinois	0																			
Indiana	0																			
Iowa	0																			
Kansas	0																			
Kentucky	6	1 D						5 D												
Louisiana	11	3 D														8 D				
Maine	0																			
Maryland	26	3 D						18 D			1 R					2 D	1 R ^a			
Massachusetts	0																			
Michigan	2							1 M						1 D						
Minnesota	1													1 TR						
Mississippi	10	3 D		1 D												6 D				
Missouri	0																			
Montana	2							2 E												
Nebraska	0																			
Nevada	5							3 D					2 R ^a							
New Hampshire	0																			
New Jersey	0																			
New Mexico	0																			
New York	1													1 MK						
North Carolina	0																			
North Dakota	0																			
Ohio	3										1 BC			1 SK		1 SK				
Oklahoma	8	1 D	1 H					2 BF	1 E							2 BF	1 E			
Oregon	25							1 E			1 BC					4 UC		1 R ^a		
Oregon								1 WC			2 K					2 R		1 R ^a		
Pennsylvania	1															1 BC				
Rhode Island	0																			
South Carolina	25	6 D		3 D				8 D						1 R		7 D				
South Dakota	0																			
Tennessee	2	1 D						1 D												
Texas	20	1 AN						1 D			3 BC			2 R ^a	9 R	1 D			1 AN	
Utah	1							1 D												
Vermont	1														1 F					
Virginia	13	1 D						7 D								5 D				
Washington	0																			
West Virginia	0																			
Wisconsin	0																			
Wyoming	2													1 R	1 AN					
Puerto Rico	0																			
Virgin Islands	3							3 D												

ADE from 5-55

MAR 1963

Key to Hosts:

AN Antelope E Elk MK Mink TR Otter
 B Bear F Fox R Rabbit WC Wildcat
 BF Buffalo K Coyote RC Raccoon
 D Deer H Horse SK Skunk

Key to species:

a. *Dermacentor parumapertus*
 b. *Ixodes angustus*
 c. *Ixodes rugosus*
 d. *Ixodes dentatus*

USDA-ARS